Amendments to the Claims

Amend claims 22, 23, 30, 34, 36, 46 and 47; and add new claims 48-61 as follows:

1-11. (canceled)

12. (withdrawn) A method for inhibiting expression of a protein by a large circular single-stranded nucleic acid molecule targeted to an RNA encoding the protein comprising contacting a cell expressing the protein with the composition according to claim 36, which is targeted for the protein.

13. (withdrawn) The method according to claim 12, wherein expression of said target protein causes cell proliferation or cancer.

14. (withdrawn) The method according to claim 13, wherein said cancer is leukemia, lung cancer, liver cancer, colon cancer, stomach cancer, pancreatic cancer, brain cancer or prostate malignancy.

15. (withdrawn) The method according to claim 14, wherein said cancer is leukemia, cervical cancer, or breast cancer.

16. (withdrawn) The method according to claim 13, wherein said target protein is tumor necrosis factor, nuclear factor, MYB, MYC, RAS, or cell division kinase.

17. (withdrawn) The method according to claim 12, wherein said protein is a viral protein.

18. (withdrawn) The method according to claim 17, wherein said virus is herpes, human papilloma virus (HPV), HIV, small pox, mononucleosis (Epstein-Barr virus), hepatitis, or respiratory syncytial virus (RSV).

19. (withdrawn) The method according to claim 12, wherein expression of said target protein causes a metabolic disease or an immunological disorder.

20. (withdrawn) The method according to claim 19, wherein said metabolic disease is phenylketonuria (PKU), primary hypothyroidism, galactosemia, abnormal hemoglobins, types I and II diabetes, or obesity.

21. (withdrawn) The method according to claim 18, wherein said immunological disorder is Sjogren's Syndrome, antiphospholipid syndrome, immune complex diseases, Purpura, Schoenlein-Henoch, immunologic deficiency syndromes, systemic lupus erythematosus, immunodeficiency, rheumatism, kidney, or liver sclerosis.

22. (currently amended) A chimeric large circular single-stranded nucleic acid molecule comprising a plurality of target gene-specific antisense regions, wherein said nucleic acid molecule is effective for reducing expression of said ~~genes~~ gene, wherein the molecule is at least about 3,000 nucleotides long.

23. (currently amended) A composition comprising ~~a chimeric large circular single-stranded~~ the nucleic acid molecule ~~comprising a plurality of target-specific antisense regions, which are specific for a plurality of target genes, wherein said nucleic acid molecule is effective for reducing expression of said genes~~ according to claim 48, and a pharmaceutically acceptable carrier thereof.

24. (withdrawn) A method for inhibiting expression of a plurality of proteins comprising contacting a cell expressing the proteins with the target-specific composition according to claim 36.

25. (withdrawn) A method for inhibiting cell proliferation, comprising, administering to said cell the composition according to claim 30, in which inhibiting expression of a target gene or genes inhibits cell proliferation.

26. (withdrawn) A method of making a the large circular single-stranded nucleic acid molecule comprising target-specific antisense region according to claim 30, which inhibits expression of a protein, comprising,

(i) inserting a target-specific DNA of interest into a phage or phagemid genome;

(ii) allowing the phage to generate a single stranded form, which is the large circular nucleic acid molecule; and

(iii) isolating said large circular nucleic acid molecule.

27. (withdrawn) A method of screening for a function of a gene comprising,

(a) generating a large circular single-stranded nucleic acid molecule comprising a target-specific antisense region;

(b) contacting the cell with the composition according to claim 30, such that the molecule enters the cell and hybridizes to an RNA expressed in the cell to inhibit expression of its gene product; and

(c) assaying the cell for a variation of a phenotype.

28. (withdrawn) The method according to claim 27, wherein steps (a) to (c) are applied to a library of said large circular single-stranded nucleic acid molecule.

29. (withdrawn) The method according to claim 27, wherein said nucleic acid molecule is a single stranded form of a recombinant bacteriophage or phagemid genome.

30. (currently amended) A composition comprising:

(i) a large circular single-stranded nucleic acid molecule comprising at least one target gene-specific antisense region, wherein said large circular single-stranded nucleic acid molecule is effective for reducing expression of said gene, wherein said molecule is at least about 3,000 nucleotides long; and

(ii) a eukaryotic cell transfection effective carrier thereof comprising a lipid.

31. (previously presented) The composition according to claim 30, wherein the antisense region of the molecule is at least about 50 nucleotides long.

32. (previously presented) The composition according to claim 30, wherein the antisense region is complementary to an entire gene sequence.

33. (previously presented) The composition according to claim 30, wherein the nucleic acid molecule is a single stranded recombinant bacteriophage or phagemid genome.

34. (currently amended) The composition according to claim ~~30~~ 33, wherein said bacteriophage or phagemid is a filamentous phage.

35. (previously presented) The composition according to claim 34, wherein the filamentous phage is phage M13.

36. (currently amended) A composition comprising:

(i) a large circular single-stranded nucleic acid molecule comprising at least one target gene-specific antisense region, wherein said large circular single-stranded nucleic acid molecule is effective for reducing expression of said gene, wherein said molecule comprises a recombinant bacteriophage or phagemid genome; and

(ii) a eukaryotic cell transfection effective carrier thereof comprising a lipid.

37. (previously presented) The composition according to claim 36, wherein the antisense region of the molecule is at least about 50 nucleotides long.

38. (previously presented) The composition according to claim 36, wherein the antisense region is complementary to an entire gene sequence.

39. (previously presented) The composition according to claim 36, wherein the molecule is at least about 3,000 nucleotides long.

40. (withdrawn) A method for inhibiting expression of a protein by a large circular single-stranded nucleic acid molecule targeted to an RNA encoding the selected protein comprising

contacting a cell expressing the protein with the composition according to claim 30, which is targeted for the protein.

41. (previously presented) A chimeric large circular single-stranded nucleic acid molecule comprising a plurality of target-specific antisense regions, wherein said nucleic acid molecule is effective for reducing expression of said genes, wherein said molecule comprises a recombinant bacteriophage or phagemid genome.

42. (currently amended) A composition comprising ~~a chimeric large circular single stranded nucleic acid molecule comprising a plurality of target specific antisense regions, wherein said nucleic acid molecule is effective for reducing expression of said genes~~ the nucleic acid molecule according to claim 41, and a pharmaceutically acceptable carrier thereof.

43. (withdrawn) A method for inhibiting expression of a plurality of proteins comprising contacting a cell expressing the proteins with the target-specific composition according to claim 30.

44. (withdrawn) A method for inhibiting cell proliferation comprising administering to said cell the composition according to claim 30, in which inhibiting expression of a target gene or genes inhibits cell proliferation.

45. (withdrawn) A method of screening for a function of a gene comprising,

(a) generating a large circular single-stranded nucleic acid molecule comprising at least one target-specific antisense region;

(b) contacting the cell with the composition according to claim 36, such that the molecule enters the cell and hybridizes to an RNA expressed in the cell to inhibit expression of its gene product; and

(c) assaying the cell for a variation of a phenotype.

46. (currently amended) The composition according to claim 30, wherein the ~~transfection effective carrier~~ the lipid is a liposome.

47. (currently amended) The composition according to claim 36, wherein the ~~transfection effective carrier~~ the lipid is a liposome.

48. (New) The chimeric large circular single-stranded nucleic acid molecule according to claim 22, wherein the antisense regions are specific for a plurality of target genes.

49. (New) A composition comprising the nucleic acid molecule according to claim 22, and a pharmaceutically acceptable carrier thereof.

50. (New) The composition according to claim 30, wherein the lipid is a cationic lipid.

51. (New) The composition according to claim 36, wherein the lipid is a cationic lipid.

52. (New) An eucaryotic host cell comprising a large circular single-stranded nucleic acid molecule comprising at least one target gene-specific antisense region, wherein said large circular single-stranded nucleic acid molecule is effective for reducing expression of said gene, wherein said molecule is at least about 3,000 nucleotides long.

53. (New) The host cell according to claim 52, which is a mammalian cell.

54. (New) The host cell according to claim 53, which is a human cell.

55. (New) The host cell according to claim 52, which is a diseased cell.

56. (New) An eucaryotic host cell comprising a large circular single-stranded nucleic acid molecule comprising at least one target gene-specific antisense region, wherein said large circular single-stranded nucleic acid molecule is effective for reducing expression of said gene, wherein said molecule comprises a recombinant bacteriophage or phagemid genome.

57. (New) The host cell according to claim 56, which is a mammalian cell.

58. (New) The host cell according to claim 57, which is a human cell.

59. (New) The host cell according to claim 56, which is a diseased cell.

60. (New) An eukaryotic host cell comprising the nucleic acid according to claim 22.

61. (New) An eukaryotic host cell comprising the nucleic acid according to claim 41.